CLAIMS

What is claimed:

1. An injection molding apparatus comprising:

a mold body having a cavity for forming a hollow molded plastic part;

a source of fluent plastic fluidly connectable to said cavity;

a runner for supplying fluent plastic from said source to said cavity;

at least one fluid injection pin mounted to said mold body and connectable to a fluid source;

a reservoir positioned remote from said cavity and selectively connectable to said runner; and

a valve positioned adjacent a mouth of said runner, said valve being operable between a first state at which said reservoir is fluidly connected to said runner, and a second state at which said reservoir is blocked from fluid communication with said runner.

2. The injection molding apparatus of claim 1 wherein said mold cavity has an upstream end and a downstream end;

said runner is fluidly connected to said mold cavity at a gate positioned adjacent said upstream end; and

said at least one fluid injection pin is positioned proximate said downstream end.

3. The injection molding apparatus of claim 2 wherein said gate directs fluent plastic from said fluent plastic source into said mold cavity in a substantially downstream direction during a plastic injection cycle, and said at least one fluid injection pin directs fluid into said mold cavity in a substantially upstream direction during a plastic ejection cycle.

4. The injection molding apparatus of claim 1 further comprising actuating means for operating said valve member between said first and said second states.

5. The injection molding apparatus of claim 4 wherein said valve is hydraulically actuated.

6. The injection molding apparatus of claim 4 wherein said valve is pneumatically actuated.

7. The injection molding apparatus of claim 4 wherein said valve is electromechanically actuated.

8. The injection molding apparatus of claim 1 wherein a volume of said runner is greater than or equal to a volume of plastic ejected from said cavity by fluid injected through said at least one fluid injection pin.

9. A process for injection molding of fluid filled plastic bodies in an apparatus having a mold cavity and a separate fluid reservoir, the process comprising the steps of:

connecting a source of flowable plastic material fluidly to the mold cavity with a supply passage;

positioning at least one fluid injection pin partially within the mold cavity, the fluid injection pin being connectable to a fluid source;

injecting a quantity of flowable plastic into an interior of the mold cavity through the supply passage;

cooling part of the plastic melt along walls of the mold cavity, thereby providing an interior of flowable, plastic melt;

injecting a quantity of fluid from the fluid source into the interior of flowable, plastic melt;

selectively expelling at least a portion of the interior of flowable, plastic melt into the supply passage; and

selectively expelling at least a portion of fluent plastic from the supply passage into the reservoir.

10. The process of claim 9 further comprising the step of injecting a second quantity of fluid from said fluid source into the mold cavity.

11. The process of claim 9 further comprising the steps of injecting a plurality of discrete quantities of fluid from the fluid source into the mold cavity.

12. The process of claim 9 wherein the step of injecting a flowable plastic is characterized by injecting the flowable plastic material in a downstream direction; and

the step of injecting a quantity of fluid is characterized by injecting the gas in an upstream direction to eject a portion of the flowable plastic from the mold.

13. A method of forming a hollow injection molded plastic part, the method comprising the steps of:

providing a mold body having a mold cavity;

connecting a source of fluent plastic to the mold cavity with a runner passage;

mounting at least one fluid injection pin to the mold body, and connecting the pin to a fluid source;

injecting a quantity of fluent plastic via the runner into the mold cavity;

injecting a quantity of fluid into the mold cavity, thereby expelling a portion of the quantity of fluent plastic to the runner, leaving a hollow plastic body around the periphery of the mold cavity; and

selectively connecting the runner to a reservoir and expelling a quantity of fluent plastic to the reservoir.

14. The method of claim 13 wherein said fluid source is a source of compressible fluid.

15. The method of claim 13 wherein said fluid source is a source of non-compressible fluid.

16. The method of claim 13 wherein said fluid source is a source of both compressible and non-compressible fluids.

17. The method of claim 13 further comprising the steps of providing a valve operable to connect the runner to a reservoir; and

actuating the valve, thereby allowing the quantity of fluent plastic to be expelled from the runner to the reservoir.

18. The method of claim 17 further comprising the step of actuating the valve to halt an expulsion of fluent plastic from the runner.